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joined the Open University as Professor of Systems in January 1994 where he led a process of organizational change resulting in the formation of the Centre for Complexity and Change. He was foundation Director of the Postgraduate Program in Environmental Decision Making and fostered the launch of the MSc in Information Systems in 2004. He is also foundation Director of the Open Systems Research Group comprising 20 researchers (see http://systems.open.ac.uk), one of the largest Systems research group in the world with research foci on systems thinking and practice, information systems and sustainable development. In the period 2001-4 he coordinated a major European project entitled Social Learning for the Integrated and Sustainable Use of Water at Catchment Scale (SLIM) involving researches from Sweden, France, Italy, the Netherlands and the UK. He is also co-Director of the EPSRC funded SPMC (Systems Practice for Managing Complexity) Network which after three years has become self funding and has made significant contributions to formulating new research directions for Systems and for raising awareness of the role Systems practice can play in areas such as Information Systems, organizational change, project management, etc (see http://www.spmc.open.ac.uk). Ray's research involved developing and evaluating systemic, participatory and process-based environmental decision making, natural resource management, organizational change and R&D methodologies. Examples discussed in his publications include second-order R&D; systemic inquiry, social learning, soft systems methodology, systemic action research; information systems; modeling; communities of practice and participatory institutional appraisal. He is the author or editor of three books, 16 book chapters, 40 refereed journal and 27 refereed conference papers and has been invited as keynote speaker at a range of conferences in Australia, Brazil, Ecuador, France, Germany, Ireland and Sweden. He is on the editorial board of three journals. At the present time he is on sabbatical leave at the Melbourne Water Research Centre, University of Melbourne.

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History repeats itself: current traps in complexity practice from a systems perspective

Abstract

This paper discusses the history of systems scholarship and how this has been translated into particular forms of purposeful action, like complexity practice. Both systems and complexity approaches have something to offer when the situation is no longer amenable to analysis based on linear causality or reductionist approaches. In the hands of aware practitioners both offer epistemological devices for shifting our mental furniture and both are rich sources of metaphors, which have the capacity to trigger new and emergent understandings. In the last 70 or so years of systems scholarship those involved have diverged into a plethora of traditions or lineages, conserving, knowingly or not, one of two epistemological positions: the objectivist or positivist position and the constructivist or interpretivist position. These two epistemological positions constitute two language communities even though many who participate in them are unaware that they do. The trap in all of this is that so many people act without awareness of the positions that they hold or uphold and the historicity of their thinking and acting, resulting in conflict, rejection, lack of valuing of difference, bifurcation into smaller and smaller communities of practice, unethical practice, etc. Based on examples coming from academic practice, research management, modeling practice, policy praxis, among others, the implications of this lack of awareness are discussed.

Introduction

If we accept that "systems is a seminal word for complexity" (Morin, 1999), then systems thinking and systems practice are fundamental competencies in the learning process involved in managing situations of complexity of the 'real-world'. As academics we have been engaged with various traditions of systems thinking and practice, and this paper is based on our engagement with, and understandings of, the history of Systems scholarship, and how this has been translated into particular forms of purposeful action, like complexity practice. This has been for us also one of the main reasons to engage with the rapidly expanding 'complexity' literature.

As we engaged with both the systems and complexity material and activities of those who were enthusiastic about both we began to become aware of a number of things:

(i) History seemed to be repeating itself, as for example through the repetition of concepts and methods coming originally from cybernetics;

(ii) A lot of the scholarship was, frankly, appalling –most obvious of all was the lack of scholarly appreciation of the intellectual traditions on which particular claims rested;

(iii) Yet another opportunity to deal seriously with the important things that Systems and Complexity perspectives had in common seemed in danger of being lost – in the sense of the fragmenting discourses, interest groups, lack of institutionalisation – especially in Universities and in such pragmatic arenas as skills and competency frameworks for the professions. This seemed particularly tragic to us as these sorts of skills seem more needed now than at many other historical moment.

Similar concerns have been expressed also by others. For example, on Principia Cybernetica (http://pcp.lanl.gov/DEFAULT.html) the authors observe:

> *Some recent fashionable approaches have their roots in ideas that were proposed by cyberneticians many decades ago: e.g. artificial intelligence, neural networks, complex systems, human-machine interfaces, self-organization theories, systems therapy, etc. Most of the fundamental concepts and questions of these approaches have already been formulated by cyberneticians such as Wiener, Ashby, von Bertalanffy, Boulding, von Foerster, von Neumann, McCulloch, and Pask in the 1940's through 1960's.'*

These fashionable approaches are usually labelled as:

> *the emerging "sciences of complexity", also called "complex adaptive systems", studying self-organization and heterogeneous networks of interacting actors (e.g. the work of the Santa Fe Institute), and associated research in the natural sciences such as far-from-equilibrium thermodynamics, catastrophe theory, chaos and dynamical systems. A third strand are* [sic] *different high-level computing applications such as artificial intelligence, neural networks, man-machine interaction and computer modelling and simulation.*

As we had done, they noted that:

> *Unfortunately, few practitioners in these recent disciplines seem to be aware that many of their concepts and methods were proposed or used by cyberneticians* [and systems practitioners] *since many years. Subjects like complexity, self-organization, connectionism and adaptive systems have already been extensively studied in the 1940's and 1950's, by researchers like Wiener, Ashby, von*

2

Neumann and von Foerster, and in discussion forums like the famous Josiah Macy meetings on cybernetics. Some recent popularizing books on "the sciences of complexity" (e.g. Waldrop, 1992) seem to ignore this fact, creating the false impression that work on complex adaptive systems only started in earnest with the creation of the Santa Fe Institute in the 1980's.

As an example, for Capra (Capra, 2002: 93) concepts like feedback and emergence have been developed by complexity theory. We think however the issues are more serious than even those on Principia acknowledge – they are issues which are common to both the systems and emerging complexity traditions. Therefore, in this paper we want to explore what is at issue and why we think they have arisen. We also want to give some practical examples of why it matters. To do this we want to start by exploring some aspects of what it is to be human so as to invite you to reflect on what it is that you, and others, do when you/they do what you/they do!

Explaining explanations

We start by inviting you to consider 'explanations' as a social phenomenon: When is an explanation an explanation? For example how many of you would accept Tony Blair's explanation of the reasons for going to war with Iraq? What about Einstein's equation $E=mc^2$ as an explanation of the quantum world? Or the account in Genesis of the origins of human beings?

We will argue that all explanations arise in social relations; following Vickers (1965) they give rise to our standards of fact and value. Moreover all explanations arise this way but some are conserved over longer time frames than others. Explanations also

'enter our bloodstream' as we live our lives – throughout our biological and social development. Maynard Keynes' oft quoted remark that in his experience those who claimed to be practical men (sic) were usually victims of some theory [or explanation] 30 years out of date exemplifies our point. Humberto Maturana (see Maturana & Poerkson, 2004) also draws attention to the role that explanations play in the lives of human beings – as young people we seek explanations, inquisitiveness is a feature of children raised in supportive contexts, and explanations are something we find satisfying, or not; they thus trigger emotional reactions. This is an important qualitative feature that rises from the explainer – listener – explanation relationship.

<div align="center">Living in language</div>

Our explanation of explanations leads us to language. Everything said is said by someone. My world is different to your world and that is always so – what we have in common are our capacities for perceiving and languaging which both have an evolutionary basis. This leads to claims that we live in language, or languaging as Maturana (Maturana & Poerkson, 2004) would have it. This is a big issue and we only want to provide passing mention to it here. But we raise it because we would like to invite you to reflect on what happens in professional life when people belong to different language communities (e.g., the systems and complexity language communities).

Considering language also warrants a brief mention of metaphor. In the research carried out by one of us at the OU a comprehensive review of metaphor theory and practice concluded that (McClintock, Ison and Armson, 2004):

4

*   metaphors are linked to understandings, and can inform research that aims to

work with diverse understandings;

*   metaphors play an important role in how we use language;

*   metaphors work by 'restructuring' domains;

*   'Systems' and 'complexity are a fertile ground for considering metaphors; and

*   a metaphor can be seen as a description, and recognised by the use of the words

'is' and 'as'.

One way of summarising this is that if we agree that we live in language then we also live in metaphor. But recent cognitive science research (Lakoff & Johnson, 1999) suggests it could be put another way: we do not use language and metaphor but they use us!

We do what we do living in language and with a desire to find satisfying explanations – and associated relationship making and breaking. Although we live in an ever unfolding present, that present is determined by our history and context. We thus come to any situation with our own models of understanding. These grow out of traditions; a tradition is a network of prejudices that provides possible answers and strategies for action or, following Gadamer (Gadamer, 1975), as a network of pre-understandings (because the word prejudices may be literally understood as a pre-understanding). Traditions are not only ways to see and act but a way to conceal; they arise in the doing and are not labels for ways of acting and constitute the basis of praxis.

Sir Geoffrey Vickers (1972: 15) conceptualised this same phenomenon using the metaphor of the lobster pot as a man trap:

Lobster pots are designed to catch lobsters. A man entering a lobster pot would

become suspicious of the narrowing tunnel, he would shrink from the drop at the

end: and if he fell in, he would recognise the entrance as a possible exit and climb

out again – even if he were the shape of a lobster. A trap is a trap only for the

creatures which cannot solve the problems it sets. Man traps are dangerous only

in relation to the limitations of what men can see and value and do…

Different traditions and distinct epistemologies

From our perspective one of the main characteristics of the last 70 or so years of systems

scholarship is the extent to which those involved have diverged into such a plethora of

traditions or lineages. Each lineage represents to us the conservation of a particular

language community. Some lineages are more robust than others and some have stronger

institutional capital than others (e.g. bigger societies, strong figure-heads etc). From our

perspective those engaged in these diverse traditions conserve, knowingly or not, one of

two epistemological positions. What is more these two positions are already apparent

with the equally broad and bifurcating 'complexity' domain.

The epistemological positions are:

(i) objectivist or positivist – for these people 'systems' exist in the world and thus

are describable, discoverable, able to be modelled etc. This is the legacy of

general Systems Theory and can be typically spotted whenever the phrase

'systems science' is written. It is Peter Checkland's 'hard' systems tradition

(Checkland, 1999). It has cultural dimensions – more common in North America

and within aspiring or existing 'big science' communities. Within the field of

complexity the term 'complexity science' is also a warning sign. This

epistemology characterises the Santa Fe group and its publications. It is what we

describe as descriptive complexity (Schlindwein & Ison, 2004), i.e. complexity is in the world, describable, able to be modelled etc.

(ii) constructivist or interpretivist – for these people the role of the observer is crucial – systems are always brought forth by someone in a context. The act if formulating or seeing system is a way of knowing about the world, not an entity in it. A 'system' and the act of constructing a system thus becomes an epistemological device – a way of understanding and learning about situations in the world. It is no longer sciencia but praxis. In the field of complexity we have described this as perceived complexity – something which arises in the relationship between someone and a situation (Schlindwein & Ison, 2004). As such it is a choice we can make. It is the *as if* position – let us engage with this situation as if it were complex, or let us learn about this situation through a process of formulating systems of interest.

Now these two epistemological positions constitute two language communities even though many who participate in them are unaware that they do. They are language communities in the sense that we use the term because members of each community bring forth different traditions of understanding when they do what they do. They admit different claims and thus accept or reject particular explanations. What is more they often act without awareness; some act in ways that abrogate responsibility by claiming that their explanation is 'the truth' or 'objective'- the path of objectivity to use Maturana's term (Maturana, 1988). In social relations this is at the same time a claim to do as we say!

Why does this matter? For us the good news is:

(i) both systems and complexity approaches have something to offer when situations are no longer amenable to 'mainstream' practice of analysis based on linear causality or reductionist approaches;

(ii) in the hands of aware practitioners systems and complexity approaches both offer epistemological devices for shifting our mental furniture – for 'managing' complexity;

(iii) both are rich sources of metaphors – and these metaphors have the capacity to trigger new and emergent understandings.

But what is the bad news? The trap in all of this is not that one position or the other is right or wrong, better or worse, but that so many people act without awareness of the position that they hold or uphold and without awareness of the historicity of their thinking and acting. The product of lack of awareness is conflict, rejection, lack of valuing of difference, bifurcation into smaller and smaller communities of practice, unethical practice and struggles to build institutional capital or brand around particular groupings or discourses.

Let us briefly give some examples from our recent experience:

(i) Academic practice – peer review. Academic publication rests on peer review. Those who have been through the process know that it can be a mixed experience. At its worst one can become the victim of contradictory reviews which, we suggest, can often be seen as contrasting but undisclosed epistemological positions. It is rare in our experience for reviewers to state their own epistemological preference before reviewing a

paper. Take the following points made by reviewers of a 300 word abstract for an international complexity conference:

- Drawing upon views of French philosopher, Gaston Bachelard, the paper develops a poetic, metaphorical framework to understand the complexity of human life;

- The authors need to clarify their use of the term "complexity" and its cognates, in particular its relationship to non-linear, dynamical "complexity theory";

- The idea is original but, in my opinion, too far-fetched and taking for granted in very different thinkers similarities in conceptual and semantic contents that seem more like only analogies in formulations.

The recommendations ranged from enthusiastic acceptance to rejection.

(ii) Research management. This example comes from recent European (Framework 5) experience of one of us as being the coordinator of a five country, 30 researcher project (see http://SLIM.open.ac.uk). The Framework programmes are significant not least in monetary terms: Framework 6 totalled €17.5 billion and Framework 7 is projected to be €40 billion. What is clear is that DG (Directorate General) Research is unable to orchestrate an epistemological conversation nor is it aware of the implications of not doing so. We have empirical evidence of this, having interviewed a range of staff from DG Research as well as Brussels-based NGO and industry representatives (SLIM, 2004a). Traditionally research projects are largely set up as blueprints with outcomes specified in advance (contract deliverables). This has some advantages in some types of research and as an accountability mechanism but does not

guarantee the best research outcomes or that the research addresses the espoused issues of concern. At the heart of this conundrum are epistemological issues and projects can be at the mercy of the epistemology of their supervising project officer (similar roles operate in most projects). In practice the scope for negotiation and renegotiation of research deliverables depends on the relational capital (SLIM, 2004b) that is built up between the research project, especially the coordinator, and the scientific officer.

From our interviews we identified two prevailing epistemological predispositions: one associated with '*Transfer of Knowledge*' with features such as (i) policy blueprints; (ii) seeing policy implementation as distinct from policy development; (iii) role of 'standards'; (iv) need for new science (facts); (v) questioning the role of social research; (vi) need for better communication i.e. a first-order conception of communication; (vii) doing research on (people); (viii) complexity as knowable; (ix) consumer and thus market focus. The contrasting predisposition was '*Knowing in Action*' with features such as (i) policy as process; (ii) implementation integral to development (of policy); (iii) policies adaptive to local contexts; (iv) need for new stories or narratives; (v) recognised a role for social research; (vi) learning; co-construction; (vii) research with….; (viii) complexity not knowable – new ways?; (ix) citizen focus- ecoliteracy.

(iii) The fallacy of the toolbox. Over several encounters between SLIM researchers and research managers in DG Research they experienced the pervasive use of the term 'tools' and gained a strong perception that for many, particularly in DG Research, their desire was to have research produce new tools which could be used by the clients of research (e.g. other DGs, national actors etc). The way the metaphor was used had several entailments: the apparent desire by those who used the metaphor to contribute

to making the EU work for which tools (levers, instruments etc) were needed; 'tools' to fix or remedy particular problems; tools as something that anyone could use. What the metaphor concealed however was that a tool (e.g. a hammer) requires a user (a hammerer) and something to which the tool is applied (something that has to be hammered). Our experience was that those who use this metaphor focus on the hammer but rarely the hammerer or the hammered, thus failing to see that hammering, as a practice is context sensitive and is ultimately a performance usually conducted for some purpose. Within systems and complexity approaches all to frequently a 'system' or a CAS can be seen as the hammer – a tool not associated with devoid of understanding of its historical and contextual derivation and how in context it can become part of a performance.

Concluding remarks

As we have discussed by means of several examples, the implications of lack of epistemological awareness in systems and complexity practices are far reaching, and not restricted to particular domains of human activity. In our view the objectivist or positivist position is the dominant position in the complexity sciences and its practices, although there seems little awareness of this dominance amongst those who claim to be complexity practitioners. We assume that the huge effort that has been made to understand (by modelling, for example) situations of complexity in their details so as to better control and manipulate them, is an explicit manifestation of what we are claiming here. For us however, purposeful action in such situations can be carried out through systems practices designed to learn how to manage them, which is also a way to refute Rescher's claim (Rescher, 1998) that the complexity of real problem-situations is beyond our

capacity to act. To avoid the epistemological trap in complexity practice requires awareness, which is also an act of responsibility. Being epistemologically aware also opens up more choices for action (Schlindwein & Ison, 2004).

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